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Dependent Self-employment across Europe: Involuntariness, country's wealth and labor market institutions (*)

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Abstract

This paper investigates the degree of involuntariness in the entrepreneurial activity of the dependent solo self-employed, as well as the effect of the country's wealth and labor market institutions. Using the unique information available in the 2017 European Labor Force Survey (EU-LFS) for 25 countries, we can properly identify the dependent solo self-employed and analyze to what extent they behave in accordance with an occupational choice model when making their self-employment decision. For that, we account for the reasons why they enter into self-employment (voluntarily or involuntarily either out of necessity or requested by the former employer). The results indicate that involuntary self-employment, mostly due to being required by previous employer, significantly increases the probability of being dependent solo versus non-dependent self-employed. The wealthiest countries have a lower incidence of this group of workers, mainly if they are involuntary self-employed. Moreover, labor market institutions that decrease the flexibility of paid employment tend to increase the incidence of dependent solo self-employment. These results point to this group of workers being particularly vulnerable with the degree of vulnerability significantly increasing for those self-employed with a lesser degree of occupational choice.

JEL codes: J01, J08, J28, L24, L26.

Keywords: dependent solo self-employed, involuntariness, economic conditions, labor market institutions.

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1. Introduction

Political and academic interest in self-employment has increased over the years because it is considered an important source of new jobs and an alternative to paid employment. However, it is well known that the self-employed make up a heterogeneous group of workers with some of them being in a "grey area" between wage-employment and a proper entrepreneurial activity. In particular, in recent years there has been a shift towards greater outsourcing, which has led to an increase in the number of workers defined as "false" self-employed. The main reason behind this phenomenon is it is less costly for employers to hire self-employed workers than to hire employees.

The emergence of this type of employment activity has generated a great deal of interest because of its potential impact on traditional labor market relations and because it creates a strong demand for social protection (Perulli, 2003; Thörnquist, 2015). Consequently, many governments have introduced policies for its regulation (Eichhorst et al. 2013; Eurofound, 2017). Thus, it seems relevant to study these self-employed separately because we can expect their motivations, characteristics and the effect of the macroeconomic conditions and labor market institutions to differ from the self-employed who are considered entrepreneurial in nature.

Different definitions have been used in the literature to discuss and deliberate this issue. For instance, Vries et al. (2020) focus on the solo self-employed (those self-employed without employees) as a particularly vulnerable group. Nevertheless, in our view the self-employed that depend economically on a single client (who in many cases is the former employer) are subject to greater income uncertainty and vulnerability. Typically, these self-employed behave similarly to employees with respect to their lack of capacity for making business decisions, but have a more precarious situation in terms of the benefits that the employees enjoy. We recognize that even within the economically dependent self-employed there is a great deal of heterogeneity. In particular, many of them do not have the capacity to create jobs for others. Thus, we investigate the subset of "dependent solo self-employed" (hereafter DSSE) who probably are the group that is most similar to employees but who have a lesser degree of labor protection and a higher degree of income insecurity.

From a theoretical perspective, as Boeri et al (2020) point out, self-employment is typically treated as a labor supply decision -voluntary sorting by individuals- and it does not incorporate demand-driven determinants. However, it is precisely these factors that could be crucial for the dependent solo self-employed. Compared to other self-employed that may enter into this activity searching for flexibility, the DSSE would prefer to have regular employment and only become self-employed to avoid unemployment or because they have been forced to do so by their employers. Thus, we analyze to what extent the DSSE behave in accordance with an occupational choice model when making their self-employment decision.

We take advantage of the unique information available in the 2017 European Labor Force Survey (EU-LFS) ad-hoc module on self-employed workers for 25 countries. It allows us to properly define the DSSE as those self-employed without employees who worked for only one client who decides about his/her working hours, and to account for the reasons why they start an entrepreneurial activity. In particular, workers describe themselves as involuntarily involved in self-employment (either out of necessity or requested by the previous employer) or as voluntary self-employed, who actively choose to become entrepreneurs to exploit business opportunities.

There are significant differences in the prevalence of DSSE between countries, and it is well known that macroeconomic conditions and institutions also matter for entrepreneurial activity. By exploiting the cross-country variation in our sample, we also study the effect of the country's wealth and labor market institutions on the incidence of the DSSE. The literature typically comes up with a list of institutional variables that may explain entrepreneurial differences between countries (Centeno, 2000; Dilli et al. 2018; Malchow-Møller et al. 2010; Torrini, 2005). In this paper, we focus on the effect of the GDP per capita as a proxy for capital per worker, and four different indicators to measure the orientation of labor-market

institutions in terms of regulation of permanent employment: the temporary employment rate, the employers´ social security contributions as a percentage of total labor costs, the degree of centralization in wage bargaining and the share of public sector. If the DSSE are affected differently than non-dependent self-employed by these variables, and if their effect changes depending on the degree of involuntariness in the decision, this should be taken into account when designing specific policies to protect them or to improve their labor market outcomes.

Our results indicate that the DSSE are a particularly vulnerable group because they are more likely to enter into this activity due to involuntary reasons and, therefore, less likely to respond to the typical occupational choice model. They are also more likely to be negatively affected by a country's wealth, particularly if they are involuntary self-employed being forced to do so by the former employer. Moreover, our results confirm that employers tend to substitute regular employees with dependent solo self-employed when they face labor market institutions that increase the protection of the paid employed. Nonetheless, at sample magnitudes, these effects are significantly smaller than that of GDP per capita.

The paper is organized as follows. Section 2 describes some theoretical predictions about the effect of involuntariness as a push factor to become dependent solo self-employed and about the effect of the macroeconomic and institutional environment. Section 3 presents the EU-LFS database and provides some descriptive evidence. The econometric specification and estimation method are described in Section 4, and Section 5 summarizes the main findings. Section 6 states the conclusions.

2. Literature review and main hypotheses

As we will show, the incidence of DSSE is fairly heterogeneous across European countries and deserves careful analysis. Until recently, most cross-country labor market empirical analyses have focused on overall self-employment while research on dependent or solo self-employment has been mostly conducted at a country level or for a small group of countries. We structure this section around two working hypotheses we want to analyze empirically. First, involuntariness as a push factor to became DSSE versus non-dependent self-employed and, second, the impact of a country's wealth and different labor market institutions across countries.

2.1. DSSE as an involuntary choice

Our first hypothesis deals with involuntariness as a push factor to became dependent solo self-employed. Motivations for working as self-employed may involve time flexibility or autonomy. While from the employer's perspective, the motives for choosing self-employed workers may involve partial transfer of entrepreneurial risk, the circumvention of labor and social security law, as well as regulations from collective bargaining (Eichhorst et al. 2013).

Most of the theoretical literature on self-employment use a model of occupational choice as a starting point (see for example Evans and Leighton, 1989, and Rees and Shah, 1986). Individuals who have found a business opportunity decide voluntarily whether to follow it or not. What they choose depends upon a comparison of the utility they expect to receive in the alternative occupations, including factors such as more autonomy in organizing their time or the benefits of being their own boss (Hurst and Pugsley, 2011). However, while this could be an appropriate starting point for explaining the self-employment decision for non-dependent self-employed, there could be reasons for which an important proportion of the dependent solo self-employed do not make any choice. Therefore, treating this type of self-employment as a choice does not allow for demand-driven determinants that are probably crucial for them (Boeri et al., 2020).

Empirical literature on the dependent self-employed mostly focuses on their role to allow employers to reduce labor costs and to evade employment protection legislation looking for flexibility. Nevertheless, one of the shortcomings of these papers is that, due to data limitations, it is not possible to account for the reasons behind the self-employment decision and, therefore, the degree of occupational choice. Moreover, different papers use different definitions of dependent self-employed. For instance, Böheim and Mühlberger (2009), using longitudinal data from the British Labour Force Survey (BLFS) use a definition

for the dependent self-employed similar to ours,[1] but they do not account explicitly for the reasons why they start the self-employment activity but only whether the main reason for entering or leaving dependent self-employment is due to changes in customer numbers. Román et al. (2011) associate dependent self-employed to those switching to self-employment that declare having started working with the same employer or business while they were employees, and Kautonen et al. (2009) adopts the notion of involuntary self-employed but lacks the notion of dependency.

Another strand of the literature focuses on the comparison between the dependent self-employed with the non-dependent ones or the paid-employed in terms of some job market outcomes. For instance, Millán et al. (2020) using data from the European Working Conditions Survey (2010) study whether job control, job demands and job outcomes of dependent self-employed workers are more similar to those of the self-employed or paid employed. They consider as dependent self-employed those self-employed without employees who respond negatively to at least 2 of these 3 questions: (i) whether her firm generally has more than one client, (ii) whether she can hire employees and (iii) whether she makes the most important decisions on how to run the business. Therefore, they include in their definition both economically and personally dependent self-employed.

In this paper, we only focus on the economically dependent solo self-employed and on the reasons why they become self-employed, not on their job market outcomes. The data set we use homogeneously identifies them for all European countries and it is the first data set that offers information about the degree of occupational choice when facing the self-employment decision. Therefore, we can account simultaneously for the phenomenon of dependency and involuntariness. Moreover, it also contains a battery of questions that allow us to study the degree of job satisfaction of this group of self-employed workers.

2.2. Country's wealth, labor market institutions and the incidence of DSSE

Our second set of hypothesis has to do with the impact of economic conditions and the institutional framework on DSSE differences across countries. As to the former, Torrini (2005) or Centeno (2000), taking per capita GDP as a proxy for capital per worker, finds that the richest countries typically have a lower incidence of overall self-employment, while Baumann et al. (2012) find a negative although non-significant relationship between the per capita GDP level and self-employment rate. In this paper, we analyze to what extent a rise in the level of GDP per capita is associated with a decline in the returns to DSSE versus non-dependent self-employment and whether this effect changes depending on the degree of involuntariness.

The literature has also focused on the relationship between the strictness of employment protection legislation (EPL, generally measured using the OECD cross-country ranking) and the incidence of overall self-employment. Employers may try to circumvent high firing and hiring costs by contracting-out self-employed workers. However, the available evidence is not conclusive. Some studies (Grubb and Wells, 1993; OECD, 1999 and Centeno, 2000) report a positive relationship, while more recent research (Robson, 2003, Baumann et al. 2012 and Torrini, 2005) finds less robust evidence for a positive relationship. Roman et al. (2011) detected a positive impact of EPL on transitions to dependent self-employment and the opposite effect for independent self-employment.

Nonetheless, the EPL may be an insufficient indicator to show the consequences of labor rigidity in segmented labor markets. Several countries have passed labor reforms aimed at reducing the gap between highly protected workers on regular contracts and poorly protected workers on temporary contracts, but many of them have not achieved their purpose: the use of fixed-term contracts has persisted as the main source of external flexibility. Thus, EPL indicators are useful for showing the differences in national labor

[1] The BLFS defined dependent self-employed as self-employed workers who have no employees and only one customer, while according to our definition based on Eurostat (2018) DSSE are those self-employed without employees who worked for only one client and this client decides about his/her working hours.

market legislation across time, but they may be insufficient for reflecting the actual role of fixed term contracts as mechanisms of workforce adjustment in a firm's personnel policy. Moreover, as the OECD (2020) recognizes, the coverage of enforcement issues in the OECD indicators remains limited overall, as they do not take into account certain aspects of the functioning of the judicial system, such as access to labor courts or the length of proceedings. Boeri and Jimeno (2005) also point out that there would be interactions between the EPL and other institutional features as well as measurement errors[2] that question the validity of many findings using the EPL. Therefore, in this paper we have chosen to include, as a more appropriate indicator of labor market flexibility, the rate of temporary employment.[3]

Moreover, the relationship between labor market rigidity and the share of DSSE versus non-dependent self-employment might be sensitive to the inclusion of other institutional variables. In this paper, we consider the share of workers in the public sector, social security contributions paid by the employers and the degree of centralization of collective bargaining agreements as other measures related to the regulation of the labor market. Torrini (2005) examines the role of the public sector in crowding-out overall self-employment, finding a negative relationship between both variables. As for taxation, some studies found a positive relationship between taxation and self-employment (Eichhorst et al. 2013; Muehlberger and Bertolini 2008; Román et al. 2011) on the ground that self-employed workers would have greater opportunities to hide their income from the tax authorities. However, other authors have challenged this view arguing that taxation could discourage entrepreneurial activities (Fölster 2002; Davis et al. 1999). Torrini (2005) finds that taxation can either spur or reduce the self-employment rate depending on the country's attitude towards tax evasion. In this paper, we study the effect of the social security contributions paid by the employers to their employees as a percentage of total labor costs. Finally, contracting out self-employed workers has also become a way of circumventing the rules imposed by collective agreements. In addition, more centralized wage structure may also affect the worker's incentives to become self-employed, as a way of evading the institutionalized compression (Malchow-Møller et al.2010).

In sum, previous empirical evidence offers mixed evidence about the differences between countries in the use of self-employed workers and, in particular, of new and more precarious forms of self-employment (dependent and solo) and about the role that labor market institutions can play in these differences. In this paper, we conduct an analysis for a large group of European countries, which allows us to analyze the effect of the institutional setting on increasing/decreasing the incidence of DSSE versus non-dependent self-employment as well as the effect of variables at an individual level focusing on the degree of involuntariness that this type of occupation entails.

3. Data description

3.1. The data set

The data set comes from the 2017 EU-LFS ad-hoc module on self-employed workers coordinated by Eurostat, which conducts this survey in the 28 Member States of the European Union and three EFTA countries (Iceland, Norway and Switzerland). A key advantage of the 2017 module is that it provides specific information about self-employment not usually available in other data sets regarding the reasons why individuals work as self-employed. This information can be complemented with the annual information traditionally offered by EULFS on personal and job characteristics. This paper explores two of the three sub-modules available in this sample: sub-module one related to the economically dependent self-employed, and sub-module two related to working conditions for the self-employed and, more specifically, the main reasons for becoming self-employed.

[2] Measurement errors arise because there is within-country variation in the actual enforcement of regulations, which is not captured by cross-country analyses.

[3] Casey (1988) points out that temporary employment is generally accepted as an important component of a "flexible" labor force.

The cross-sectional sample used in this paper collects information on self-employed with or without employees (non-family workers) and employees aged 16 to 65 not working in the agricultural sector. We exclude this sector owing to the special characteristics of self-employment in agriculture and the fact that agricultural employment in general has been noticeably decreasing since the 1960's. We also exclude those who declare not having had customers/clients during the last 12 months and unpaid family workers. We consider individuals from 25 European countries.[4]

We select the subsample of self-employed workers. Out of 52,338 observations without missing values for any of the relevant variables, 3,533 (6.7%) correspond to dependent solo self-employed, defined as those self-employed without employees who worked during the last 12 months before the reference week of the survey for only one client and this client decides about her working hours. This definition is more restrictive than the one adopted by Eurostat (2018) for which economically dependent self-employed were defined as self-employed without employees who worked for only one client or for a dominant client. We analyse the robustness of our results to this less restrictive definition of the dependent self-employed for which we have 5,549 observations. As to the non-dependent self-employed, they encompass self-employed workers with more than one client, with or without employees. We disregard the observations corresponding to dependent self-employed with employees (only 345 in the total sample) to delve into the concept of dependency and the lack of occupational choice, but we also study the robustness of our results to the inclusion of this group of workers among the non-dependent self-employed.

The explanatory variables used in the estimation can be classified into three groups: demographic and job-related characteristics, variables that capture the degree of occupational choice and job satisfaction, and macroeconomic variables related to country's wealth and the institutional framework. In the first group, we include gender, age, marital and immigrant status, education, occupation, activity, tenure, and part-time employment. Most of these are grouped into categories and are treated as dummies in the estimation. In the second group, we consider a dummy variable, SE_invol, which takes the value 1 if the individual is involuntary self-employed and 0 if she is voluntary, and a dummy variable, SE_invol_emp, which takes the value 1 if she is involuntary because the former employer requested it and 0 if she is either involuntary out of necessity or voluntary. Moreover, we include a variable that captures the degree of job satisfaction, and dummies for the desire to work more hours and for having autonomy in the job. Finally, in the third group as country level characteristics we include the log of the GDP per capita, the share of social security contributions paid by the employers, the rate of temporary employment, the share of the public sector, and the degree of centralization of the bargaining in the wage determination. In the Appendix, we report information about the definition of the variables.

3.2. Descriptive evidence

Figure 1 displays information about three indicators concerning self-employment by country: the share of self-employed over total employment (SE), the share of dependent self-employed (DSE) with and without employees over total self-employment, and the proportion of dependents who simultaneously are solo self-employed (DSSE).

Cross-country differences in self-employment rates are substantial, ranging from a low of 5 percent in Norway to a high of 24 percent in Greece. Large differences are also observed in the proportion of dependent self-employment with a group of countries (Slovakia, Romania, Norway, Italy and the UK) clearly above the European average. Moreover, as previously pointed out, most of the dependent self-employed do not have employees and the cross-country differences also hold in terms of this group.

[4] Austria (AT), Belgium (BE), Bulgaria (BG), Switzerland (CH), Czechia (CZ), Germany (DE), Denmark (DK), Spain (ES), Finland (FI), France (FR), Greece (GR), Hungary (HU), Ireland, (IE), Italy (IT), Latvia (LV), Lithuania (LT), the Netherlands (NL), Norway (NO), Poland (PL) Portugal (PT), Romania (RO), Slovenia (SL), Slovakia (SK), Sweden (SE) and the United Kingdom (UK). Data from Cyprus, Luxembourg, Malta, Estonia, Croatia, and Iceland have been eliminated due to the lack of sufficient observations to carry out the analysis.

Previous cross-country variations may be related to macroeconomic conditions and institutional differences. Figure A.1 in the Appendix plots the percentage of DSSE by country against some macroeconomic variables. It shows a tendency for the incidence of dependent solo self-employment to be lower in countries with higher GDP per capita and higher temporary employment rates and share of public sector. There is also a negative correlation with the degree of centralization of wage bargaining and a lack of correlation with the social security contributions paid by the employers. We will study whether or not these unconditional correlations still hold when we estimate a multivariate econometric model.

Table 1 presents the distribution of different types of self-employed workers according to the involuntariness of the decision, job autonomy, and level of job-satisfaction. It shows that more than 32 percent of the DSSE (33.6 percent in case of women)[5] declare themselves to be involuntary, either because they could not find a job as an employee (24.7 percent) or because her former employer requested it (7.8 percent). These figures decrease to around 20 percent for dependent self-employed with employees and to 15 percent for non-dependent self-employed. Similar figures are found if we use another variable that captures to a certain extent the degree of involuntariness that is the proportion of self-employed workers who declare that they would prefer to work as a conventional employee. This descriptive evidence is in line with the hypothesis that it is likely that the dependent self-employed, particularly if they are solo, do not behave according to the traditional occupational choice model.

Moreover, DSSE are the less satisfied with their job (the proportion of not satisfied workers is almost 3 percentage points greater among the DSSE than among the non-dependent self-employed). They face constraints on how many hours they can work and a lack of autonomy, since around 11.6 percent (14 percent of the women) declare that they would like to work more hours and more than 44 percent state that they do not have autonomy in the job. These figures decrease to around 16 percent and 18 percent for the non-dependent self-employed, with the differences across groups being statistically significant.

Table 2 presents the main descriptive statistics in terms of worker and job characteristics. Whilst self-employed are predominantly male, the proportion of females is the lowest among dependent self-employed with employees. The proportion of young, single and immigrant workers is higher among the DSSE than among the other groups of self-employed, as well as the proportion of low qualified white and blue-collar workers. We also find that mean tenure and mean number of hours worked are lower for the DSSE than for the other groups of self-employed. This evidence is in accordance with Muehlberger and Pasqua (2009) who find a high short-term persistency of DSE in Italy, and with Böheim and Muehlberger (2009) who get similar results for the United Kingdom, associating these jobs with more volatile labor market connections.

4. Empirical model

To study the effect of macroeconomic and individual variables on the probability of being DSSE versus non-dependent self-employed we use discrete choice models. Let $DSSE_i$ be a dummy variable taking the value 1 if the individual i is dependent solo self-employed and 0 if she is non-dependent self-employed. The probability of interest can be expressed as a conditional expectation as follows:

$$(1). \qquad \Pr(DSSE_i = 1|X_i) = F(X_i'\beta) \quad i = 1, \ldots . N,$$

where X_i is a vector of covariates and F denotes the logistic cumulative distribution function:

$$(2). \qquad F(z) = \frac{\exp(z)}{(1+\exp(z))}.$$

As previously explained, our specification includes three types of covariates within the vector X_i: (i) worker and job characteristics, (ii) variables that capture the degree of occupational choice and job satisfaction, and (iii) institutional and labor market characteristics defined at a country level. Some of the

[5] Table A1 in the Appendix presents these descriptive statistics by gender.

variables are interacted with the degree of involuntariness so that we can check whether their effect on the likelihood of becoming DSSE is different depending on the reasons for becoming self-employed.

The model is estimated by Maximum Likelihood (ML) for the whole sample and for men and women separately. We report two types of results. Firstly, we discuss the impact of the variables in terms of the sign and statistical significance of their estimated coefficients. Secondly, we report the average marginal effects (AME's) of the main variables of interest. These are the ultimate parameters of interest in this type of non-linear models. Given that our specification includes interactions between some of the explanatory variables and a set of dummy variables that capture the main reason for becoming self-employed, the marginal effect of these variables is different depending on the value of these dummies.

To illustrate this point, let us consider for instance the AME of the log of the GDP per capita. Our specification includes the log of the GDP per capita and its interaction with the dummy for involuntary self-employment and the dummy for involuntary self-employment because the employer requested it. Specifically:

$$(3). \quad \Pr(DSSE_i = 1|X_i) = F(\beta_0 + \beta_1 SE\_invol_i + \beta_2 SE\_invol\_emp_i + \beta_3 logGDP_i + \beta_4 logGDP_i \times SE\_invol_i + \beta_5 logGDP_i \times SE\_invol\_emp_i + W_i'\delta),$$

where W_i denotes the vector of the rest of covariates included in the model. Therefore, the AME of the log of GDP for voluntary self-employed is obtained as:

$$(4). \quad \left(\beta_3 \times \frac{1}{N}\sum_{i=1}^{N} f(\beta_0 + \beta_3 logGDP_i + W_i'\delta)\right),$$

where *f* denotes the logistic density function. Similarly, the AME of the log of GDP for involuntary self-employed is obtained as:

$$(5). \quad \left((\beta_3 + \beta_4) \times \frac{1}{N}\sum_{i=1}^{N} f(\beta_0 + \beta_1 + (\beta_3 + \beta_4) logGDP_i + W_i'\delta)\right),$$

for those who are involuntary out of necessity, and

$$(6). \quad \left((\beta_3 + \beta_4 + \beta_5) \times \frac{1}{N}\sum_{i=1}^{N} f(\beta_0 + \beta_1 + \beta_2 + (\beta_3 + \beta_4 + \beta_5) logGDP_i + W_i'\delta)\right),$$

for those who are involuntary self-employed as requested by the employer.

As to the AME of discrete variables, for instance the effect of involuntary versus voluntary self-employed, it has been calculated as:

$$(7). \quad \frac{1}{N}\sum_{i=1}^{N}\left(F(\beta_0 + \beta_1 + \beta_2 SE\_invol\_emp_i + (\beta_3+\beta_4) logGDP_i + \beta_5 logGDP_i \times SE\_invol\_emp_i + W_i'\delta) - F(\beta_0 + \beta_2 SE\_invol\_emp_i + \beta_3 logGDP_i + \beta_5 logGDP_i \times SE\_invol\_emp_i + W_i'\delta)\right).$$

5. Results

The estimates for the probability of being DSSE versus non-dependent self-employed are reported in Table 3. In the first column, we present the estimates for the whole sample, and separate estimates for men and women are reported in the second and third column, respectively.[6] The marginal effects of interest based on the corresponding logit estimations are reported in Table 4.

The estimation results indicate that DSSE tend to be younger and less educated than the non-dependent ones, although the effect of education becomes non-significant once we control by activity branch and occupation. They are also more likely to be immigrants and to work part time. We find that the probability of being dependent solo self-employed decreases with tenure. Therefore, it seems that the

[6] The final specification includes only the interactions with the dummies for the reasons for becoming self-employed that are significant in any of the samples.

most vulnerable workers in terms of age, immigrant status, seniority and attachment to the labor market are more likely to be pushed into DSSE.

Regarding the effect of the reasons for becoming self-employed, the estimates show a positive and significant coefficient for overall involuntary self-employed which is even stronger for those who are involuntary because the former employer requested it. In terms of the marginal effects, Table 4 shows that the probability of being a DSSE is 3.3 percentage points (pp) higher for the involuntary than for the voluntary self-employed. Moreover, this probability is 11.6 pp higher for those involuntary self-employed because the employer requested it than for the involuntary out of necessity. These results are even stronger for women. They point to a link between involuntariness and dependence and, in particular, to a lack of occupational choice for the dependent self-employed.

We find that job satisfaction is negatively correlated with DSSE, although this effect is only significant for those self-employed who were forced to do so by the former employer and particularly strong for women: for those who declare being not-satisfied with her job the probability of being DSSE increases by 34 pp. The same type of negative correlation is found for the dummy that indicates whether the worker enjoys autonomy in the job: it decreases the probability of being DSSE by around 7 pp for the voluntary self-employed and by 13 pp for the involuntary ones. Another effect that indicates a lower degree of job satisfaction of the DSSE is the one given by the desire to work more hours: it decreases by around 3 pp the probability of being dependent solo self-employed among the involuntary self-employed workers.

As to the impact of country-level variables, we find that in those countries where the GDP per capita is higher the probability of being DSSE decreases. Moreover, there is an increasing negative correlation according to the degree of occupational choice: the strongest negative effect is for the involuntary self-employed forced to do so by the employer, while the weakest effect is for the voluntary self-employed. For instance, increasing the GDP per capita by 1% decreases the probability of being DSSE by 22 pp for those involuntary self-employed forced to do so by the employer and by 3 and 1 pp for the involuntary out of necessity and the voluntary self-employed, respectively. These effects are even stronger among women. These results again point to the fact that the DSSE are also particularly vulnerable in terms of the effect of economic conditions and that the degree of vulnerability significantly increases for those self-employed with a lesser degree of occupational choice.

Our results indicate that in those countries with a higher rate of temporary employment the probability of being DSSE decreases: when the temporary employment rate increases by 1 pp the probability of being DSSE decreases by 0.1 pp. This result points to a certain degree of substitutability between these two forms of precarious employment: as the flexibility for hiring through temporary employment increases, the incidence of dependent self-employed decreases. Similar results are found for the share of the public sector so that it seems that the expansion of the public sector crowds out private dependent solo self-employed: increasing the share of employment in the public sector by 1 pp decreases the probability of being DSSE by 0.3 pp among men and by 0.5 pp among women.

Finally, those countries with a higher degree of centralization in wage bargaining show a higher incidence of DSSE, especially among the involuntary ones: increasing by 1 point the degree of centralization increases the probability of being DSSE by 0.7 and 0.4 pp for involuntary and voluntary self-employed men respectively. These figures increase to 3.8 and 0.8 pp respectively among women. Again, it seems that employers try to circumvent the strictness of the institutional setting by pushing for more DSSE. As to the effect of the social security contributions paid by the employers, we find opposite effects for men and women: increasing them by 1 pp decreases the incidence of male DSSE by 0.1 pp and increases the incidence of women DSSE by 0.2 pp.

As a robustness check, we have performed similar estimations but using a less strict definition of the DSSE by also including among them those whose main source of income comes from one main client. The marginal effects of interest are reported in Table A3 in the Appendix. It can be seen that our main conclusions still hold: solo self-employed who depend on only one or on one main client are also more

vulnerable than the non-dependent self-employed in terms of their personal characteristics, degree of occupational choice, job satisfaction and the effect of institutional and labor market conditions.

Finally, we have estimated the models by including among the non-dependent self-employed those with only one client but with employees. Notice that this group was dropped from our previous samples. We do not include them among the dependent self-employed because they have employees, so they are different in nature from the traditional dependent self-employed. This increases the sample size by 345 observations. The estimated AME's are reported in Table A4 in the Appendix and the results are in line with the previous ones.

6. Conclusions

We analyse the degree of involuntariness in the entrepreneurial activity of the dependent solo self-employed and the effect of macroeconomic conditions and the institutional framework across countries. For that, we use microdata from the 2017 European Labor Force Survey (EU-LFS) ad-hoc module on self-employed persons and aggregated indicators to approximate a set of labor market institutions.

Our principal findings can be summarized as follows: (1) DSSE exhibit a greater degree of involuntariness than the non-dependent self-employed. This effect is significantly higher for those who are involuntary self-employed because the employer requested it than for the involuntary out of necessity, and larger for women than for men. It points to a lack of occupational choice for the dependent self-employed. (2) DSSE rates differ in a significant way across countries. In line with what the literature finds for overall self-employment (a decline in returns to entrepreneurship relative to wages as economies have more capital endowment measured by the GDP per capita), we also find that the richest countries have a lower incidence of DSSE. This negative impact of GDP is much stronger among involuntary self-employed, and particularly among those who have been requested to do so by the former employer. Moreover, at sample magnitudes the effect of GDP per capital is significantly larger than that of the labor market institutions. (3) DSSE rates are negatively affected by alternative measures of labor market flexibility, such as the temporary employment rate or the degree of centralization in the wage bargaining. In particular, we find evidence of a certain degree of substitution between two forms of precarious employment: temporary workers and DSSE. Again, strict labor market regulations tend to increase the incidence of this type of vulnerable employment, particularly for the involuntary self-employed workers. (4) There is evidence of some crowding-out of the DSSE due to the expansion of the employment in the public sector.

Our results are useful for understanding the nature of the DSSE (mainly involuntary) and to account for the potential externalities that labor market institutions and economic conditions might have on the incidence of this type of employment. The trend to increase labor market flexibility observed in many countries would have important consequences on the evolution of the DSSE. Given that the incidence of this type of employment is higher among involuntary workers, especially those forced to do so by the previous employer, points to the need for a higher degree of protection for them.

Finally, the 2017 EU-LFS ad-hoc module on self-employed persons used in this paper makes it possible to account for the reasons why individuals enter into self-employment and to use a clear definition of the DSSE. Nonetheless, its main shortcoming is that given the cross-sectional nature of the data, we are not able to analyse the dynamics of the DSSE activity. This prevents us from studying issues related to duration and transitions to other labor market states.

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Figure 1. Self-employment across a sample of European countries, EULFS 2017

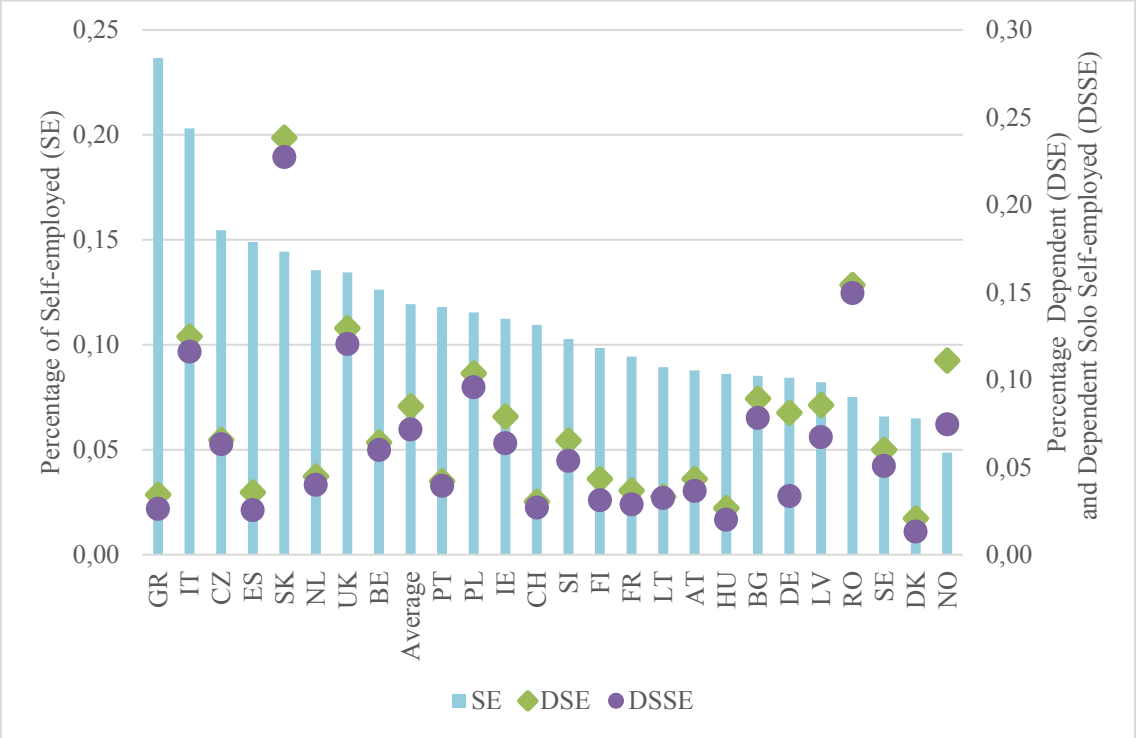


Table 1. Involuntariness, job satisfaction and autonomy, EULFS 2017

	All SE	Non-DSE	DSE with employees	DSSE	Eq. test (p-value)
Proportion of Involuntary SE:	17.0	15.7	21.8	32.5	0.0000
that could not find a job as employee	14.9	14.0	18.0	24.7	0.0000
as requested by former employer	2.1	1.6	3.8	7.8	0.0000
Proportion of SE that wish to work as employee	17.6	15.7	20.8	31.9	0.0000
Proportion of SE without total autonomy	18.6	16.4	24.2	44.3	0.0000
Proportion of SE that wish to work more hours	8.4	8.1	7.9	11.6	0.0000
Proportion of SE not satisfied	7.5	7.2	9.6	10.1	0.0000
No observations	52,338	48,460	345	3,533	0.0000

Eq. test: X^2 test for mean equality across SE groups.

Table 2. Sample means of main variables, EULFS 2017

	All SE	Non-DSE	DSE with employees	DSSE	Eq. test (p-value)
Variables (%)					
Male	66.7	66.9	74.9	63.2	0.0000
Age 16-29	8.4	7.7	6.8	17.2	0.0000
Age 30-49	53.6	53.8	48.3	51.8	0.0041
Age 50-64	38.0	38.5	44.8	31.1	0.0000
Married	62.1	62.7	63.7	54.1	0.0000
Immigrant	7.9	7.6	10.5	10.9	0.0000
Primary education	17.9	18.1	15.7	15.6	0.0096
Secondary education	43.0	42.8	38.2	45.9	0.0002
University education	39.1	39.1	46.1	38.5	0.1848
High white collar	37.4	37.6	55.6	32.8	0.0000
Low white collar	15.3	14.6	14.1	23.2	0.0000
High blue collar	44.2	45.0	28.6	36.8	0.0000
Low blue collar	3.1	2.7	1.6	7.2	0.0000
Manufacturing	8.1	8.1	8.1	7.5	0.1769
Construction	15.8	15.8	18.8	16.2	0.0308
Transportation	32.6	33.2	26.5	25.7	0.0000
Financial	3.5	3.3	6.4	5.5	0.0000
Professional	18.7	18.8	14.0	18.4	0.1050
Education and Health	11.1	10.6	22.7	14.8	0.0000
Households	0.5	0.2	0.3	4.0	0.0000
Other services	9.7	10.1	3.1	6.8	0.0000
Part-time employment	15.1	14.1	20.4	26.8	0.0000
Mean tenure	11.9	12.3	12.2	7.8	0.0000
Mean hours	41.2	41.7	41.6	35.8	0.0000
No observations	52,338	48,460	345	3,533	

Eq. test: X^2 test for mean equality across SE groups.

Table 3. Estimates for the probability of DSSE (only 1 client) versus non-dependent SE

	(1)	(2)	(3)
VARIABLES	All	Men	Women
Individual characteristics			
Men	0.037		
Age 30-49	-0.358***	-0.355***	-0.339***
Age 50-64	-0.183***	-0.236***	-0.043
Married	-0.136***	-0.190***	-0.039
Immigrant	0.226***	0.203**	0.326***
Secondary education	-0.007	-0.005	-0.068
University education	-0.085	-0.024	-0.237**
Part-time employment	0.487***	0.399***	0.704***
Tenure	-0.040***	-0.036***	-0.046***
Degree of choice and satisfaction			
SE invol.	2.442***	1.566	4.739***
SE invol. empl.	14.52***	14.99***	15.65***
Autonomy	-1.092***	-1.139***	-1.007***
Autonomy*SE invol.	-0.221***	-0.231**	-0.235*
Wish to work more hours	0.068	0.134	-0.006
Wish to work more*SE invol.	-0.564***	-0.639***	-0.413**
Job satisfaction	-0.025	-0.041	0.023
Job satisf. *SE invol. empl.	-0.545**	-0.231	-2.050***
Macroeconomic variables			
Log GDP per capita	-0.228***	-0.115*	-0.512***
LGDP* SE invol.	-0.195**	-0.094	-0.459***
LGDP* SE invol. empl.	-1.286***	-1.357***	-1.253***
Centralized wage bargaining	0.103***	0.084**	0.144***
Centrl. barg. * SE invol.	0.129**	0.023	0.334***
Social sec. contrib.	0.002	-0.014**	0.030***
Share public sector	-0.063***	-0.054***	-0.079***
Temporary empl. rate	-0.027***	-0.029***	-0.021***
Constant	2.396***	1.608**	4.650***
No Observations	51,993	33,977	18,016

The models include occupation and sector of activity. *, **, ***, denote significance at 10, 5 and 1 percent, respectively.

Table 4. Average marginal effects. DSSE (only 1 client) versus non-dependent SE

	(1)	(2)	(3)
VARIABLES	All	Men	Women
Degree of choice and satisfaction			
SE invol. vs SE vol.	0.033***	0.027***	0.039***
SE invol. empl. vs SE invol.nec.	0.116***	0.115***	0.130***
Autonomy:			
for SE vol.	-0.072***	-0.073***	-0.069***
for SE invol.	-0.130***	-0.127***	-0.127***
Wish to work more hours:			
for SE vol.	0.003	0.007	-0.0003
for SE invol.	-0.032***	-0.029***	-0.030***
Job satisfaction:			
for SE invol. nec.	-0.002	-0.003	0.002
for SE invol. empl.	-0.083***	-0.036	-0.343***
Macroeconomic variables			
Log GDP per capita:			
for SE invol. empl.	-0.223***	-0.198***	-0.290***
for SE invol. nec.	-0.031***	-0.014***	-0.076***
for SE vol.	-0.011***	-0.005**	-0.028***
Centralized wage bargaining			
for SE invol.	0.017***	0.007**	0.038***
for SE vol.	0.005***	0.004***	0.008***
Social sec. contrib.	0.0001	-0.001***	0.002***
Share public sector	-0.003***	-0.003***	-0.005***
Temporary empl. rate	-0.001***	-0.001***	-0.001***
No Observations	51,993	33,977	18,016

*, **, ***, denote significance at 10, 5 and 1 percent, respectively.

APPENDIX

Individual variables

Self-employed. The variable takes the value 1 for those individuals who identify themselves as self-employed as their main activity (with or without employees).

Dependent solo self-employed. The variable takes the value 1 for the self-employed with only one client and without employees and 0 for the self-employed with more than one client.

Involuntary Self-employed. The variable takes the value 1 for the self-employed who either could not find a job as an employee or were requested to do so by a former employer and 0 for voluntary self-employed.

Gender. The variable takes the value 1 for males and 0 for females.

Education. Grouped into three categories: Primary education, Secondary education and University education.

Age. Grouped into three categories: 16-29, 30-49, and 50-64.

Marital status. The variable takes the value 1 for married individuals and 0 otherwise.

Immigrant status. The variable takes the value 1 for immigrants and 0 for natives.

Part time employment. The variable takes the value 1 for part-time and 0 for full-time workers.

Sector of activity. We consider the following categories: Manufacturing, Construction, Wholesale, Transportation and Accommodation, Financial and Real State, Professional and administrative services, Education and Health, Households as employers, and other services.

Occupation. We consider the following categories: High white collar (managers and professionals), Low white collar (technicians), High blue collar (craftsmen and skilled workers), and Low blue collar (elementary occupations).

Tenure. Defined as the number of years working as self-employed.

Job satisfaction. The variable takes the value 1 for highly satisfied or satisfied workers and 0 for low or very low satisfied workers.

Autonomy. The variable takes the value 1 for workers able to influence both in contents and order of job tasks and 0 otherwise.

Wish to work more hours. The variable takes the value 1 for workers willing to work more hours and 0 otherwise.

National economic variables

Gross Domestic Product per capita. Source: EUROSTAT 2017.

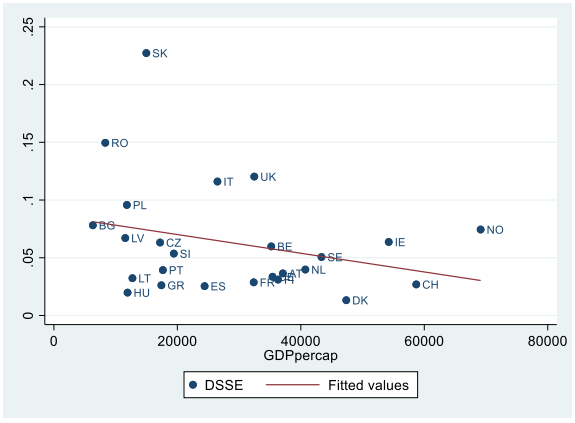
Temporary employment rate: defined as the proportion of employees with a fixed-term contract. Source: 2017, EUROSTAT.

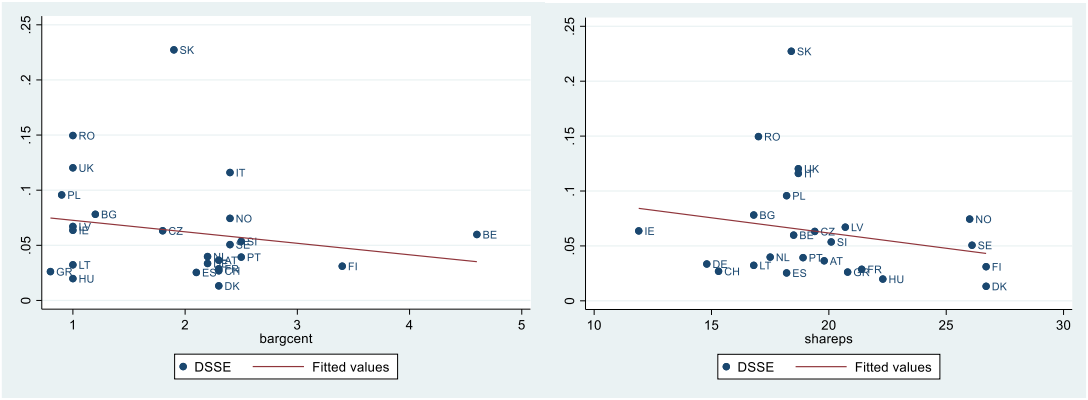
Share of public employment sector: Government employment over total employment. Source: 2017, EUROSTAT.

Employers' social security contributions: Measured as a percentage of total labor costs. Source: Labor Cost Survey, 2016, EUROSTAT.

Centralization of the wage bargaining: Continuous variable that accounts for the dominant level of bargaining (ranging from 1 -lower centralization- to 5 -higher centralization), and the incidence of and control over additional bargaining at enterprise level; the 'space' that central or sectoral agreements assign, delegate or allow for such additional bargaining to take place; and the degree to which agreements can be perforated through the use of 'opening clauses'. Source: the Amsterdam Institute for Advanced Labour Studies (AIAS) database (Visser, 2019).

Figure A1. DSSE and macroeconomic variables





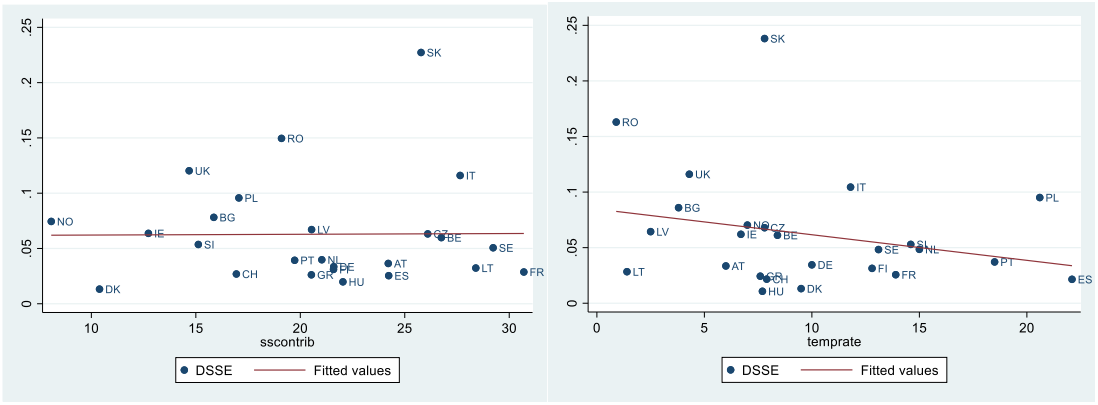


Table A1. Involuntariness, job satisfaction and autonomy by gender, EULFS 2017

	Men			Women		
	All SE	DSE with employees	DSSE	All SE	DSE with employees	DSSE
Proportion of Involuntary SE:	16.7	19.8	31.9	17.5	28.1	33.6
that could not find a job as employee	14.5	15.9	23.1	15.7	24.5	27.6
requested by former employer	2.3	3.9	8.8	1.8	3.6	6.0
Proportion of SE that wish to work as employee	16,5	14.7	29.1	19.7	37.5	36.7
Proportion of SE without total autonomy	18.5	27.6	45.4	18.7	14.2	42.5
Proportion of SE that wish to work more hours	7.5	5.4	10.1	10.2	15.4	14.1
Proportion of SE not satisfied	7.6	8.2	10.6	7.2	14	9.3
No Observations	34,243	266	2,094	18,095	79	1,439

Table A2. Sample means of main variables by gender, EULFS 2017

	Men			Women		
Variables (%)	All SE	DSE with employees	DSSE	All SE	DSE with employees	DSSE
Age 16-29	8.2	5.8	17.9	8.8	9.8	15.9
Age 30-49	52.9	47.6	51.7	55.2	50.6	51.8
Age 50-64	39.0	46.6	30.4	36.0	39.6	32.3
Married	63.2	66.1	53.3	59.9	56.6	55.6
Immigrant	8.1	7.1	11.9	7.5	20.7	9.2
Primary education	20.3	18.1	17.8	13.0	8.4	11.7
Secondary education	45.1	41.5	49.1	38.9	28.5	40.5
University education	34.6	40.4	33.1	48.1	63.1	47.8
White collar high	35.0	49.2	29.1	42.3	74.9	38.9
White collar low	14.3	15.4	22.3	17.2	10.3	24.9
Blue collar high	47.7	33.7	40.9	37.4	13.5	29.9
Blue collar low	3.0	1.7	7.6	3.1	1.3	6.5
Manufacturing	9.7	9.4	9.3	4.9	4.5	4.5
Construction	22.8	23.2	25.1	1.9	5.9	1.0
Transportation	34.4	27.6	31.3	29.1	23.1	16.0
Financial	3.5	7.2	5.6	3.4	4.0	5.4
Professional	17.7	15.6	15.0	20.7	9.3	24.2
Education and Health	6.0	13.9	8.2	21.3	48.8	29.1
Households	0.2	0.0	0.8	1.2	1.2	9.4
Other services	5.8	3.1	4.7	17.5	3.2	10.4
Part-time employment	8.6	13.2	16.0	28.2	41.9	45.3
Mean tenure	12.7	12.9	8.5	10.4	10,8	6.7
Mean hours	43.8	44.1	39.1	36.1	36.6	30.2
No observations	34,243	266	2,094	18,095	79	1,439

Table A3. Average marginal effects. DSSE (only 1 client or 1 main client) versus non-dependent SE

	(1)	(2)	(3)
VARIABLES	All	Men	Women
Degree of choice and satisfaction			
SE invol. vs SE vol.	.045***	.039***	.052***
SE invol. empl. vs SE invol.nec.	.129***	.128***	.144***
Autonomy:			
for SE vol.	-.090***	-.093***	-.084***
for SE invol.	-.174***	-.166***	-.177***
Wish to work more hours:			
for SE vol.	.029***	.036***	.019***
for SE invol.	-.039***	-.046***	-.024**
Job satisfaction:			
for SE invol. nec.	-.007	-.009	-.002
for SE invol. empl.	-.084**	-.052	-.281***
Macroeconomic variables			
Log GDP per capita:			
for SE invol. empl.	-.227***	-.219***	-.242***
for SE invol. nec.	-.022***	-.007	-.060***
for SE vol.	.002	.009***	-.015***
Centralized wage bargaining			
for SE invol.	.021***	.008	.045***
for SE vol.	.009***	.008***	. 012***
Social sec. contrib.	-.001***	-.002***	-.0002
Share public sector	-.0005	.0004	-.002***
Temporary empl. rate	-.002***	-.001***	-.002***
No Observations	51,993	33,977	18,016

*, **, ***, denote significance at 10, 5 and 1 percent, respectively.

Table A4. Average marginal effects. DSSE (only 1 client) versus non-dependent SE including SE with 1 client and employees

	(1)	(2)	(3)
VARIABLES	All	Men	Women
Degree of choice and satisfaction			
SE invol. vs SE vol.	.032***	.026***	.039***
SE invol. empl. vs SE invol.nec.	.115***	.113***	.128***
Autonomy:			
for SE vol.	-.071***	-.072***	-.069***
for SE invol.	-.128***	-.125***	-.126***
Wish to work more hours:			
for SE vol.	.004	.007	.0001
for SE invol.	-.032***	-.029***	-.032***
Job satisfaction:			
for SE invol. nec.	-.002	-.0023	.001
for SE invol. empl.	-.087***	-.040	-.348***
Macroeconomic variables			
Log GDP per capita:			
for SE invol. empl.	-.219***	-.192***	-.288***
for SE invol. nec.	-.031***	-.014***	-.077***
for SE vol.	-.011***	-.005**	-.028***
Centralized wage bargaining			
for SE invol.	.017***	.007**	.038***
for SE vol.	.005***	.004***	.008***
Social sec. contrib.	.0001	-.0007***	.002***
Share public sector	-.003***	-.003***	-.005***
Temporary empl. rate	-.001***	-.001***	-.001***
No Observations	52,338	34,243	18,095

*, **, ***, denote significance at 10, 5 and 1 percent, respectively.